

1 1. A communication system in which a first communication station
2 communicates data to at least a second communication station, the data including a first
3 data-type portion communicated upon a first channel and at least a second data-type
4 portion communicated upon at least a second channel, said communication system
5 characterized by apparatus for estimating a channel phase characteristic associated with
6 the first and at least second channels, said apparatus comprising:

7 a first data type operator coupled to receive indications of the first data-
8 type portion sent to the second communication station upon the first channel, said first
9 data-type operator for operating upon the first data-type to form a representation of the
10 first-type data portion subsequent to communication upon the first channel;

11 a second data-type operator coupled to receive indications of the second
12 data-type portion sent to the second communication station upon the second channel, said
13 second data-type operator for operating upon the second data-type to form a
14 representation of the second-type data portion subsequent to communication upon the
15 second channel; and

16 a channel phase estimator coupled to said first data-type operator to
17 receive the representations of the first data-type portion and coupled to said second data-
18 type operator to receive the representation of the second data-type portion, said channel
19 phase estimator for estimating the channel phase responsive to values of the
20 representations of both of the first and second data-type portions, respectively.

1 2. The apparatus of claim 1 wherein the communication system comprises a
2 radio communication system which defines a pilot channel and a MAC (Medium Access

3 Control) channel, the pilot channel forming the first channel and the MAC channel
4 forming the second channel, the first data-type data portion formed of a pilot signal and
5 the second data-type data portion formed of MAC-data, and wherein the channel phase
6 estimated by said channel phase estimator is responsive to values of representations of
7 both of the pilot signal and of the MAC-data.

1 3. The apparatus of claim 2 wherein said first data-type operator further
2 comprises a pilot-signal weighter for weighting the indications of the pilot signal by a
3 first selected weighting factor, the indications of the pilot signal, once weighted, forming
4 the representations of the pilot signal.

1 4. The apparatus of claim 3 wherein the second data-type further comprises a
2 MAC-data weighter for weighting the indications of the MAC-data by a second selected
3 weighting factor, the indications of the MAC-data, once weighted, forming the
4 representation of the MAC-data.

1 5. The apparatus of claim 4 further comprising a selector coupled to said
2 pilot-signal weighter and to said MAC-data weighter, said selector for selecting the first
3 and second weighting factors, respectively, by which indications of the pilot signal and of
4 the MAC-data are weighted, respectively.

1 6. The apparatus of claim 5 wherein selection by said selector of the first and
2 second weighting factors is made according to a selected selection criteria; the selected

3 selection criteria for maximizing a value of the estimated phase estimated by said
4 estimator.

1 7. The apparatus of claim 1 wherein the communication system comprises a
2 cellular communication system operable pursuant to an IS-95 (Interim Standard – 1995)
3 communication standard in which 1xEV-DO technology is deployed, wherein the first
4 data-type portion communicated upon the first channel comprises a pilot signal
5 communicated upon a time slot defining a pilot channel, wherein the second data-type
6 portion communicated upon the second channel comprises MAC-data signal
7 communicated upon a MACdata channel and wherein the channel phase estimated by
8 said channel phase estimator is formed responsive to values of the pilot signal and to
9 values of the MAC-data signal.

1 8. The apparatus of claim 7 wherein the representation of the MAC-data
2 signal formed by said second data-type operator and used by said channel phase estimator
3 to estimate the channel phase is free of values of MAC-data.

1 9. The apparatus of claim 8 wherein said second data-type operator operates
2 to remove values of the MAC-data out of the MAC-data signal.

1 10. The apparatus of claim 9 wherein the first communication station
2 comprises a network station; wherein the communication system further comprises a
3 plurality of second communication stations, each of the second communication stations

4 comprising a mobile station, and wherein the MAC-data signal contains a plurality of
5 MAC-data signal portions sent to a correspondingly plurality of the mobile stations, and
6 wherein the channel phase estimate formed by said channel phase estimator is formed
7 responsive to more than one of the MAC-data signal portions, free of values of the MAC-
8 data.

1 11. The apparatus of claim 10 wherein said second data-type operator operates
2 to remove the MAC-data out of each of the MAC-data signal portions of the MAC-data
3 signal of the more than one MAC-data signal portions.

1 12. The apparatus of claim 11 wherein the representations of the MAC-data
2 signal portions generated by said second data-type operator are representative of a
3 combined total of channel estimates responsive to communication of each of the more
4 than one MAC-data signal portions.

1 13. In a method of communicating in a communication system in which a first
2 communication station communicates data to at least a second communication station, the
3 data including a first data-type portion communicated upon a first channel and at least a
4 second data-type portion upon at least a second channel, an improvement of a method for
5 estimating a channel phase characteristic associated with the first and at least second
6 channels, said method comprising:

7 operating upon indications of the first data-type portion sent to the second
8 communication station upon the first channel, thereby to form a representation of the
9 first-type data portion subsequent to communication upon the first channel;

10 operating upon indications of the second data-type portion sent to the
11 second communication station upon the second channel, thereby to form a representation
12 of the second-type data portion subsequent to communication upon the second channel;
13 and

14 estimating the channel phase responsive to values of the representations of
15 both the first data-type portion and the second data-type portion.

1 14. The method of claim 13 wherein the communication system comprises a
2 radio communication system which defines a pilot channel and a MAC (Medium Access
3 Control) channel, the pilot channel forming the first channel and the MAC channel
4 forming the second channel, the first data-type portion formed of a pilot signal and the
5 second data-type data portion formed of the MAC-data, and wherein the channel phase

6 estimate formed during said operation estimating is formed responsive to representations
7 of both the pilot signal and the MAC-data.

1 15. The method of claim 14 wherein said operation of operating upon the
2 indications of the first data-type portion further comprises the operation of weighting the
3 indications of the pilot signal by a first selected weighting factor, the indications of the
4 pilot signal, once weighted, forming the representation of the pilot signal.

1 16. The method of claim 15 wherein said operation of operating upon the
2 indications of the second data-type portion further comprises the operation of weighting
3 the indications of the MAC-data by a second selected weighting factor, the indications of
4 the MAC-data signal, once weighted, forming the representation of the pilot signal.

1 17. The method of claim 16 further comprising the operation of selecting the
2 first and second weighting factors, respectively, by which the indications of the pilot
3 signal and of the MAC-data are weighted, respectively.

1 18. The method of claim 13 wherein the communication system comprises a
2 cellular communication system operable pursuant to an IS-95 (Interim Standard – 1995)
3 communication standard in which 1xEV-DO technology is deployed, wherein the first
4 data-type portion communicated upon the first channel comprises a pilot signal
5 communicated during a time slot defining a pilot channel, wherein the second data-type
6 portion communicated upon the second channel comprises a MAC-data signal

7 communicated upon a MAC-data channel and wherein the channel phase estimate
8 generated during said operation of estimating is formed responsive to values of the pilot
9 signal and to values of the MAC-data signal.

1 19. The method of claim 18 wherein the representations of the MAC-data
2 signal generated during said operation of operating upon the second data-type is free of
3 values of the MAC-data.

1 20. The method of claim 19 wherein the first communication station
2 comprises a network station, wherein the communication system further comprises a
3 plurality of second communication stations, each of the second communication stations
4 comprising a mobile station, and wherein the MAC-data signal comprises a plurality of
5 MAC-data signal portions sent to a corresponding plurality of the mobile stations, and
6 wherein the channel phase estimate formed during said operation of estimating is formed
7 responsive to more than one of the MAC-data signal portions free of values of the MAC-
8 data.